

CLAIMS

What is claimed is:

1 1. A method comprising:
2 reading at least one sequence of images;
3 preparing autocrop data for each image of each of the sequences of images; and
4 storing autocrop data for each key frame of the sequences of images.

1 2. The method of Claim 1 wherein preparing autocrop data comprises:
2 determining the active region of a current image of the sequences of images.

1 3. The method of Claim 2 wherein determining the active region comprises:
2 selecting a portion of the current image as the active region of the current image
3 such that all pixels outside the active region have no opacity.

1 4. The method of Claim 3 wherein selecting a portion comprises:
2 reading the current image;
3 locating a first vertical line of pixels with at least one pixel having non-zero opacity
4 closest to the origin of the image;
5 locating a second vertical line of pixels with at least one pixel having non-zero
6 opacity furthest from the origin of the image;
7 locating a first horizontal line of pixels with at least one pixel having non-zero
8 opacity closest to the origin of the image;
9 locating a second horizontal line of pixels with at least one pixel having non-zero
10 opacity furthest from the origin of the image; and
11 storing data specifying the active region of the current image.

1 5. The method of Claim 4 wherein
2 locating the first vertical line and locating the second vertical line are performed
3 before locating the first horizontal line and locating the second horizontal line; and
4 locating the first horizontal line and locating the second horizontal line each
5 comprise examining pixels between the first vertical line and the second vertical line.

1 6. The method of Claim 4 wherein
2 locating the first horizontal line and locating the second horizontal line are
3 performed before locating the first vertical line and locating the second vertical line; and
4 locating the first vertical line and locating the second vertical line each comprise
5 examining pixels between the first horizontal line and the second horizontal line.

1 7. The method of Claim 4 wherein storing data specifying the active region of
2 the current image comprises:

3 storing the x coordinate of the first vertical line, the x coordinate of the second
4 vertical line, the y coordinate of the first horizontal line, and the y coordinate of the second
5 horizontal line.

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1 8. The method of Claim 1 further comprising:
2 determining which images of each of the sequences of images are key frames.

1 9. The method of Claim 8 wherein determining comprises:
2 determining whether the current image is the first frame of one of the sequences of
3 images, and, if so, designating the current image as a key frame;
4 determining whether the active region of the current image is outside the active
5 region of a prior image, and, if so, designating the current image as a key frame; and
6 determining whether smoothing is needed, and, if so, designating the current image
7 as a key frame.

1 10. The method of Claim 9 wherein determining whether smoothing is needed
2 comprises:
3 calculating the difference in area between the active region of the current image and
4 the active region of the prior image; and
5 comparing the difference in area with a smoothing factor.

1 11. The method of Claim 10 wherein the smoothing factor is a numerical value
2 set by a user.

1 12. The method of Claim 9 wherein the active region is a portion of any image
2 such that all pixels outside the active region of the image have no opacity.

1 13. The method of Claim 2 further comprising:
2 adding a boundary to the active region of the current image.

1 14. The method of Claim 13 wherein the boundary is a numerical value set by a
2 user.

1 15. A machine readable medium having stored thereon instructions which when
2 executed by a processor cause the machine to perform operations comprising:
3 reading at least one sequence of images;
4 preparing autocrop data for each image of each of the sequences of images; and
5 storing autocrop data for each key frame of the sequences of images.

1 16. The machine readable medium of Claim 15 wherein preparing autocrop data
2 causes the machine to perform operations comprising:
3 determining the active region of a current image of the sequences of images.

1 17. The machine readable medium of Claim 16 wherein determining the active
2 region data causes the machine to perform operations comprising:
3 selecting a portion of the current image as the active region of the current image
4 such that all pixels outside the active region have no opacity.

1 18. The machine readable medium of Claim 17 wherein selecting a portion
2 causes the machine to perform operations comprising:
3 reading the current image;
4 locating a first vertical line of pixels with at least one pixel having non-zero opacity
5 closest to the origin of the image;
6 locating a second vertical line of pixels with at least one pixel having non-zero
7 opacity furthest from the origin of the image;
8 locating a first horizontal line of pixels with at least one pixel having non-zero
9 opacity closest to the origin of the image;
10 locating a second horizontal line of pixels with at least one pixel having non-zero
11 opacity furthest from the origin of the image; and
12 storing data specifying the active region of the current image.

1 19. The machine readable medium of Claim 18 wherein:
2 locating the first vertical line and locating the second vertical line are performed
3 before locating the first horizontal line and locating the second horizontal line; and
4 locating the first horizontal line and locating the second horizontal line each
5 comprise examining pixels between the first vertical line and the second vertical line.

1 20. The machine readable medium of Claim 18 wherein:
2 locating the first horizontal line and locating the second horizontal line are
3 performed before locating the first vertical line and locating the second vertical line; and
4 locating the first vertical line and locating the second vertical line each comprise
5 examining pixels between the first horizontal line and the second horizontal line.

1 21. The machine readable medium of Claim 18 wherein storing data specifying
2 the active region of the current image causes the machine to perform operations comprising:
3 storing the x coordinate of the first vertical line, the x coordinate of the second
4 vertical line, the y coordinate of the first horizontal line, and the y coordinate of the second
5 horizontal line.

1 22. The machine readable medium of Claim 15 having stored thereon further
2 instructions which when executed by the processor cause the machine to perform further
3 operations comprising:
4 determining which images of each of the sequences of images are key frames.

1 23. The machine readable medium of Claim 22 wherein determining causes the
2 machine to perform operations comprising:
3 determining whether the current image is the first frame of one of the sequences of
4 images, and, if so, designating the current image as a key frame;
5 determining whether the active region of the current image is outside the active
6 region of a prior image, and, if so, designating the current image as a key frame; and
7 determining whether smoothing is needed, and, if so, designating the current image
8 as a key frame.

1 24. The machine readable medium of Claim 23 wherein determining whether
2 smoothing is needed causes the machine to perform operations comprising:
3 calculating the difference in area between the active region of the current image and
4 the active region of the prior image; and
5 comparing the difference in area with a smoothing factor.

1 25. The machine readable medium of Claim 24 wherein the smoothing factor is
2 a numerical value set by a user.

1 26. The machine readable medium of Claim 23 wherein the active region is a
2 portion of any image such that all pixels outside the active region of the image have no
3 opacity.

1 27. The machine readable medium of Claim 16 having stored thereon further
2 instructions which when executed by the processor cause the machine to perform further
3 operations comprising:
4 adding a boundary to the active region of the current image.

1 28. The machine readable medium of Claim 13 wherein the boundary is a
numerical value set by a user.

1 29. A system comprising:
2 a processor coupled to a bus;
3 a memory coupled to the bus;
4 a storage device coupled to the bus, the storage device having stored thereon
5 instructions which when executed by the processor cause the system to perform operations
6 comprising:
7 reading at least one sequence of images;
8 preparing autocrop data for each image of each of the sequences of images;
9 and
10 storing autocrop data for each key frame of the sequences of images
11 on the storage device.

1 30. The system of Claim 29 wherein preparing autocrop data causes the system
2 to perform operations comprising:
3 determining the active region of a current image of the sequences of images.

1 31. The system of Claim 30 wherein determining the active region data causes
2 the system to perform operations comprising:
3 selecting a portion of the current image as the active region of the current image
4 such that all pixels outside the active region have no opacity.

1 32. The system of Claim 31 wherein selecting a portion causes the system to
2 perform operations comprising:
3 reading the current image;
4 locating a first vertical line of pixels with at least one pixel having non-zero opacity
5 closest to the origin of the image;
6 locating a second vertical line of pixels with at least one pixel having non-zero
7 opacity furthest from the origin of the image;
8 locating a first horizontal line of pixels with at least one pixel having non-zero
9 opacity closest to the origin of the image;

10 locating a second horizontal line of pixels with at least one pixel having non-zero
11 opacity furthest from the origin of the image; and
12 storing data specifying the active region of the current image.

1 33. The system of Claim 32 wherein:
2 locating the first vertical line and locating the second vertical line are performed
3 before locating the first horizontal line and locating the second horizontal line; and
4 locating the first horizontal line and locating the second horizontal line each
5 comprise examining pixels between the first vertical line and the second vertical line.

1 34. The system of Claim 32 wherein:
2 locating the first horizontal line and locating the second horizontal line are
3 performed before locating the first vertical line and locating the second vertical line; and
4 locating the first vertical line and locating the second vertical line each comprise
5 examining pixels between the first horizontal line and the second horizontal line.

1 35. The system of Claim 32 wherein storing data specifying the active region of
2 the current image causes the system to perform operations comprising:
3 storing the x coordinate of the first vertical line, the x coordinate of the second
4 vertical line, the y coordinate of the first horizontal line, and the y coordinate of the second
5 horizontal line.

1 36. The system of Claim 29 having further instructions which when executed by
2 the processor cause the system to perform further operations comprising:
3 determining which images of each of the sequences of images are key frames.

1 37. The system of Claim 36 wherein determining causes the system to perform
2 operations comprising:
3 determining whether the current image is the first frame of one of the sequences of
4 images, and, if so, designating the current image as a key frame;
5 determining whether the active region of the current image is outside the active
6 region of a prior image, and, if so, designating the current image as a key frame; and
7 determining whether smoothing is needed, and, if so, designating the current image
8 as a key frame.

1 38. The system of Claim 37 wherein determining whether smoothing is needed
2 causes the system to perform operations comprising:

3 calculating the difference in area between the active region of the current image and
4 the active region of the prior image; and
5 comparing the difference in area with a smoothing factor.

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1 39. The system of Claim 37 wherein the active region is a portion of any image
2 such that all pixels outside the active region of the image have no opacity.

1 40. The system of Claim 39 having stored thereon further instructions which
2 when executed by the processor cause the system to perform further operations comprising:
3 adding a boundary to the active region of the current image.

1 41. The system of Claim 29 wherein reading at least one sequence of images
2 comprises:
3 transferring at least one sequence of images from the storage device to the memory.

1 42. The system of Claim 29 wherein reading at least one sequence of images
2 comprises:
3 transferring at least one sequence of images from a remote storage device via a
4 network.